

DESIGN: AQUATIC FACILITIES



USAF DAILY USE ONLY
SERVICES
Custodial Support & Community Services

DESIGN: AQUATIC FACILITIES

Unified Facilities Criteria (UFC) 4-750-07F, *Design: Aquatic Facilities* has been developed by the HQ Air Force Services Agency and provides guidelines for:

- Evaluating
- Planning
- Programming
- Designing

indoor and outdoor aquatic facilities.



DESIGN: AQUATIC FACILITIES

The goal of the UFC is to provide design guidance for Air Force aquatic facilities that are:

- Functional
- Safe
- Aesthetically Pleasing
- Meet Expectations for Modern Facilities



FACILITY CLASSIFICATIONS:



Outdoor Pools



Natatoriums (indoor pools)

OUTDOOR POOLS:

Outdoor aquatic facilities feature water areas, deck areas, and other public and support areas that are not contained within an enclosed structure. Most areas include a bathhouse building that contain showers, restrooms, changing areas, and other staff or administrative areas.



NATATORIUMS:

Natatoriums feature enclosed spaces for water areas, deck areas, and other public and support areas. Natatoriums are permitted at installations where:

- The outdoor temperature or precipitation prohibits outdoor swimming from June 1 to September 1
- Off-season swimming facilities are necessary for various types of instruction or exercise of the military population
- It is important to provide certain aquatic activities regardless of the weather



PLANNING CONSIDERATIONS:

- Operating Policies
- Programs/Activities
- Competitive Swimming
- Clothing Storage
- Supervision/Observation
- Food and Beverage Service



CLOTHING STORAGE:

The selected method of storing user clothing may be the single most important factor influencing the design and operation of the bathhouse. Each system has a major impact on the circulation and staffing of the bathhouse. There are two options available:



Basket check-in system



Locker storage system

FACILITY SIZE:

Size requirements shall be determined by the unique needs of each base including:

- Size of U.S. and host nation military population
- Number of youth and children served by the base
- Number of spouses and authorized users
- Availability of other aquatic facilities
- Need for competitive swimming events
- Need for training activities (SCUBA, survival, etc.)

OCCUPANCY REQUIREMENTS:

Accepted industry standards for determining the occupancy and size requirements include:

- Main pools: 1.4 sq. meters (15 sq. ft) per swimmer
- Diving areas: 2.3 sq. meters (25 sq. ft) per swimmer
- Spray grounds and wading pools: 1.4 sq. meters (15 sq. ft) per child
- Bathhouses: Sized to accommodate 20% of the maximum facility capacity

DESIGN DEVELOPMENT FACTORS:

- Value and Cost
- Operating Efficiency
- Project Cost
- Simplified Construction
- Energy Management
- Environmental Influences



GENERAL USE POOLS:

General use pools are commonly utilized for lap swimming, competitive swimming, free swimming, and recreational or instructional activities.



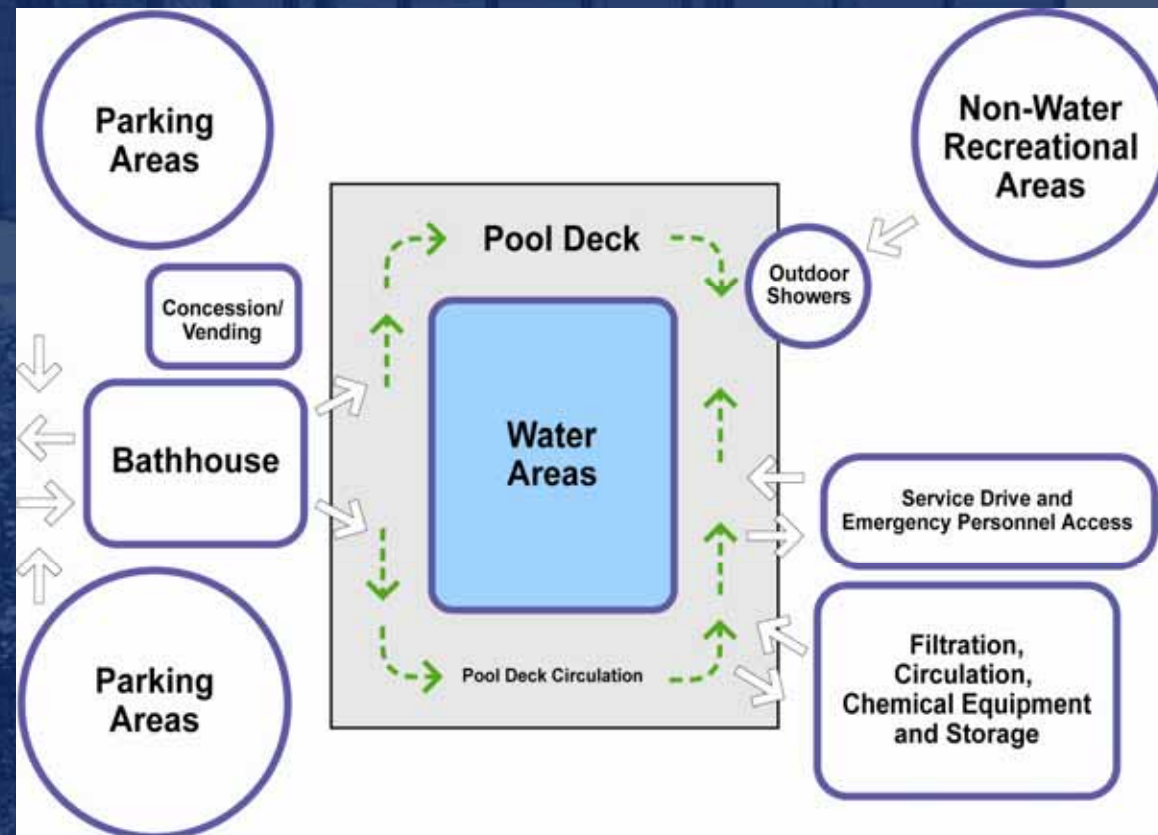
Recreational Pools



Training and Competition

SITE FUNCTIONAL AREAS:

The major component spaces to be considered during site design for outdoor pools include the bathhouse, parking areas, pool, pool deck, circulation and filtration equipment, chemical storage, service drive, and non-water recreation areas.



NON-WATER RECREATION:

Consider the need for non-water related recreational areas located inside the pool compound, such as sand volleyball courts and grass areas that may be utilized for sunbathing, throwing Frisbees, horseshoes, picnics, and similar activities.



FENCES AND GATES:

The pool and surrounding deck area shall be completely enclosed with a minimum barrier height of 1.2 meters (4 feet). The purpose of a fence of this height is to prevent children from wandering into the pool area and is not designed to prevent unauthorized access when the pool is closed. Do not use chain-link fencing.



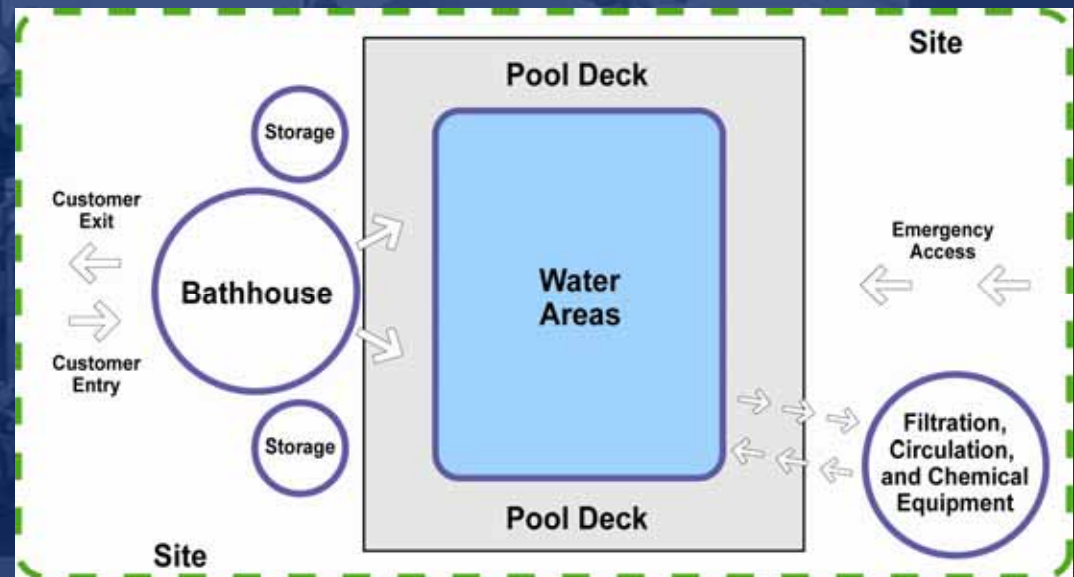
SERVICE DRIVES AND ACCESS:

Provide direct access to the pool deck from the service drive for emergencies and do not cross outdoor activity areas with service access. The size of required emergency and service vehicles should be verified prior to planning the service access areas. Service drive access should be provided to the circulation/filtration equipment and chemical storage area.



CORE FUNCTIONAL AREAS:

- Water Areas
- Pool Deck
- Bathhouse
- Filtration, Circulation, and Chemical Equipment



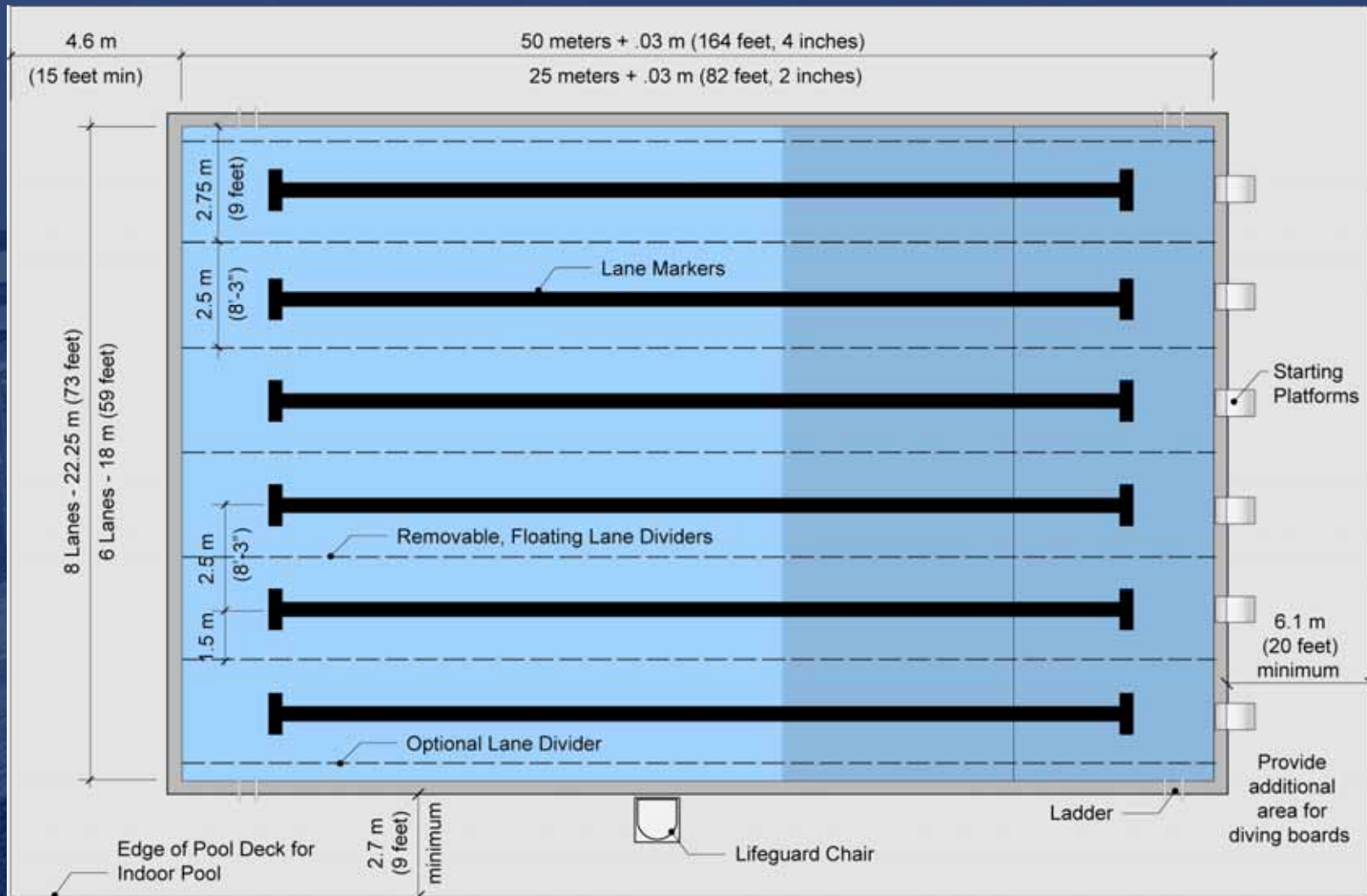
WATER AREA DESIGN:

Water areas include:

- Swimming Pools
- Diving Pools
- Wading Pools
- Spray Grounds



COMPETITIVE & LAP SWIMMING:



COMPETITIVE SWIMMING:

Consider the impact of specific institutional and host nation requirements if competitive swimming will be a part of the program requirements. Major swimming institutional organizations include:

- AAU - Amateur Athletic Union
- FINA - Federation Internationale de National
- NCAA - National Collegiate Athletic Association
- NFSH - National Federation of State High School Associations
- USS - USA Swimming

COMPETITIVE SWIMMING:

Provide racing lane and target markings according to the appropriate governing entity that may be involved in competitive events (such as the NCAA, FINA, etc.).



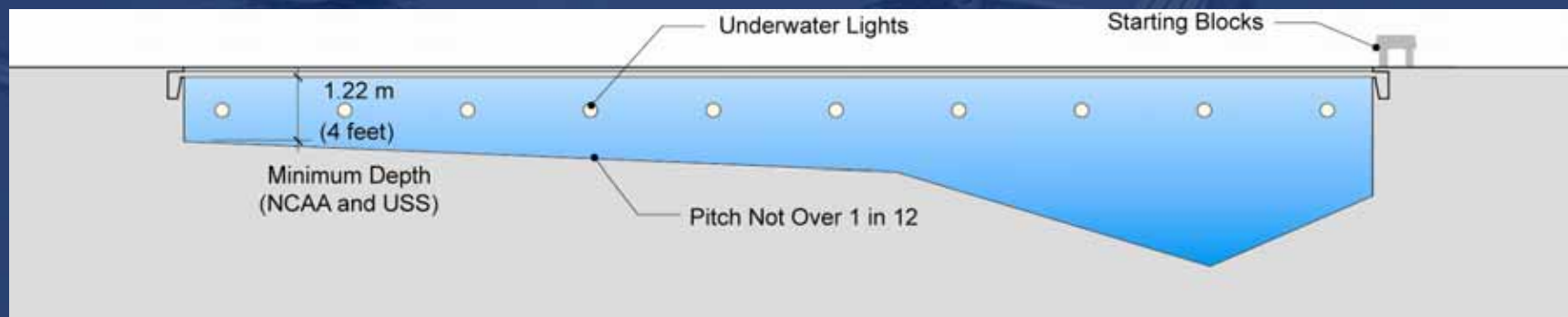
LANE AND AREA DIVIDERS:

Lane and area dividers consist of a set of continuous floats strung on a cable or cord. They are attached at hoops anchored in the pool walls. Pool dividers must incorporate some method of tensioning so that they can be stretched tight and held in position.



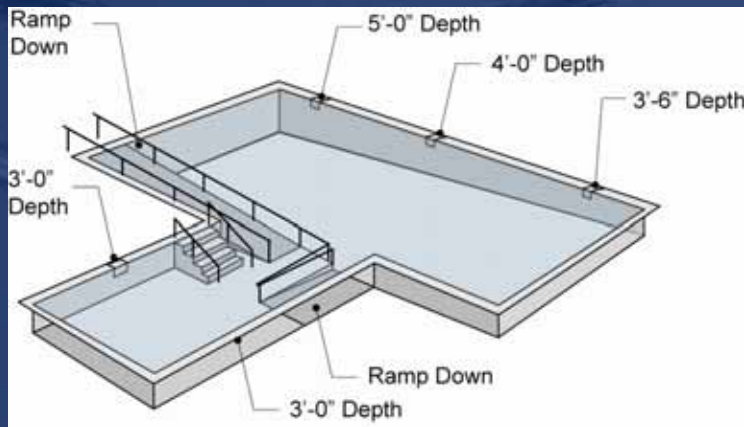
SHAPE, SLOPE, AND DEPTH:

The pool shape is determined by the length, which is typically 25 or 50 meters if it is to be utilized for competitive swimming. The width is typically determined by the number of lanes to be included. The shape of the pool is affected by the placement of the diving area, if utilized.



ACCESSIBILITY:

All functional areas shall be barrier-free and accessible to the physically handicapped. Consider the need for zero entry depth accessible ramps into pools or the need for aquatic lifts and other specialty equipment to aid the handicapped.



SPRAY GROUNDS:

Spray grounds are recommended instead of wading pools because they are generally safer, due to the fact that there is little standing water to create a drowning hazard for children.



WADING POOLS:

Existing shallow wading pools may be maintained, as needed, for small children to play and swim. Consider the possibility of replacing existing wading pools in need of repair with spray grounds.



WATER SLIDES:

Only feet first sliding is permitted. For slides that end less than 1 meter above the water, the minimum water depth is 1.5 meters for at least 4.5 meters out from the end of the slide. For slides that end higher than 1 meter above the water, the minimum water depth is 2.5 meters for at least 4.5 meters out from the end of the slide.



PLAY STRUCTURES:

Consider the need for play structures located inside the pool and other water areas similar to private sector water parks and public pools.



BULKHEADS:

Consider the need for movable fiberglass or stainless steel bulkheads that serve as barriers to re-divide water surface areas for separating multifunctional use. Movable bulkheads are very useful for competitive swimming events to provide variable short course lengths, as desired, and other recreational activities.



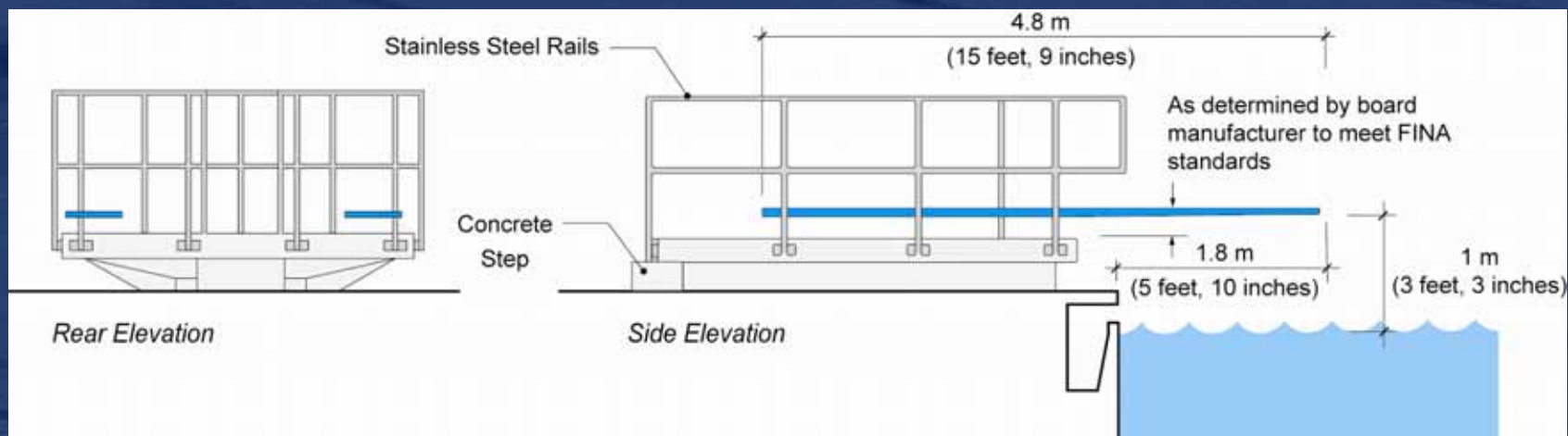
DIVING AND DEEP WATER:

These areas are used for competitive diving, recreational diving, SCUBA, survival training, and other activities requiring deep water. Diving and deep water areas may be accommodated in three possible ways:

- Locate diving areas adjacent to the deep end of a general use pool (typical “L” shaped configuration)
- Incorporate the diving area into the deep end of a general use pool
- Provide a separate pool exclusively for diving or deep water training and programs

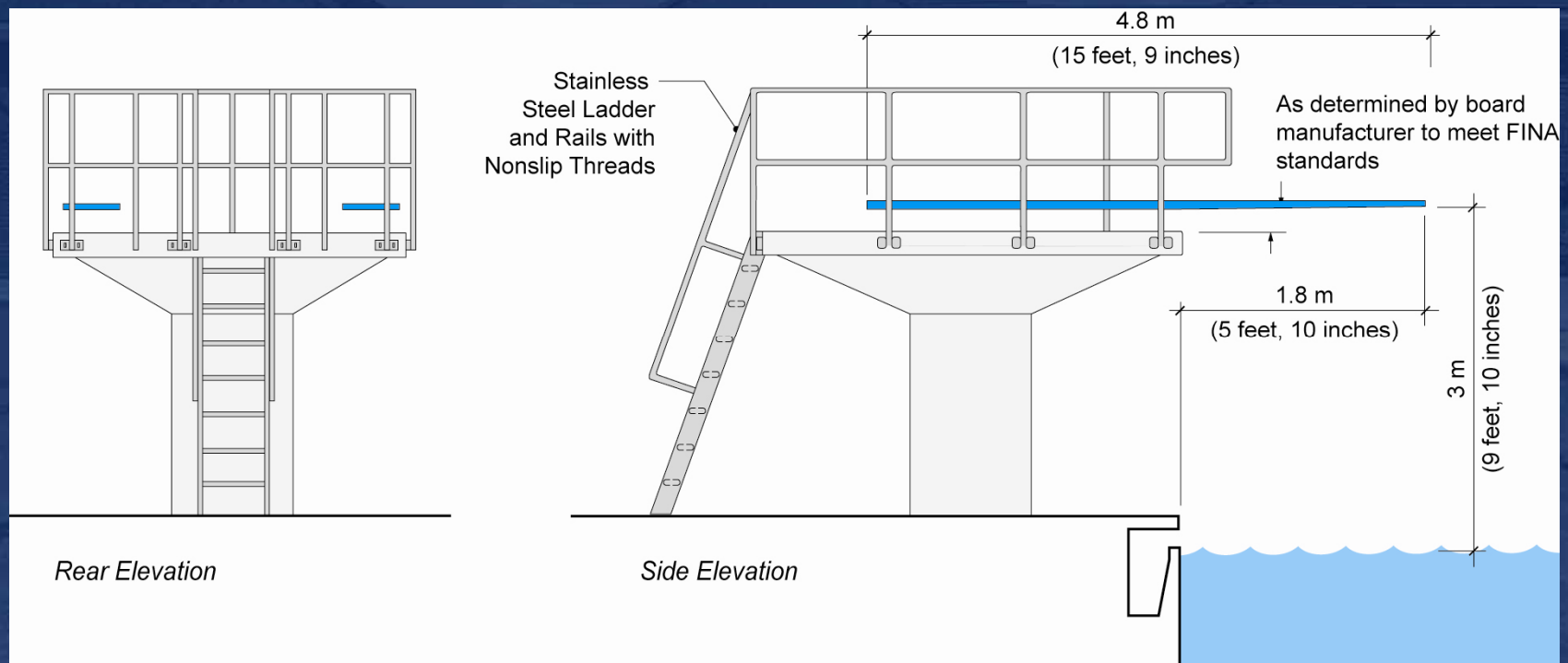
1-METER DIVING BOARDS:

The minimum water depth beneath a 1-meter diving board is 3 meters (10 feet) for at least 6 meters (20 feet) out from the end of the board.

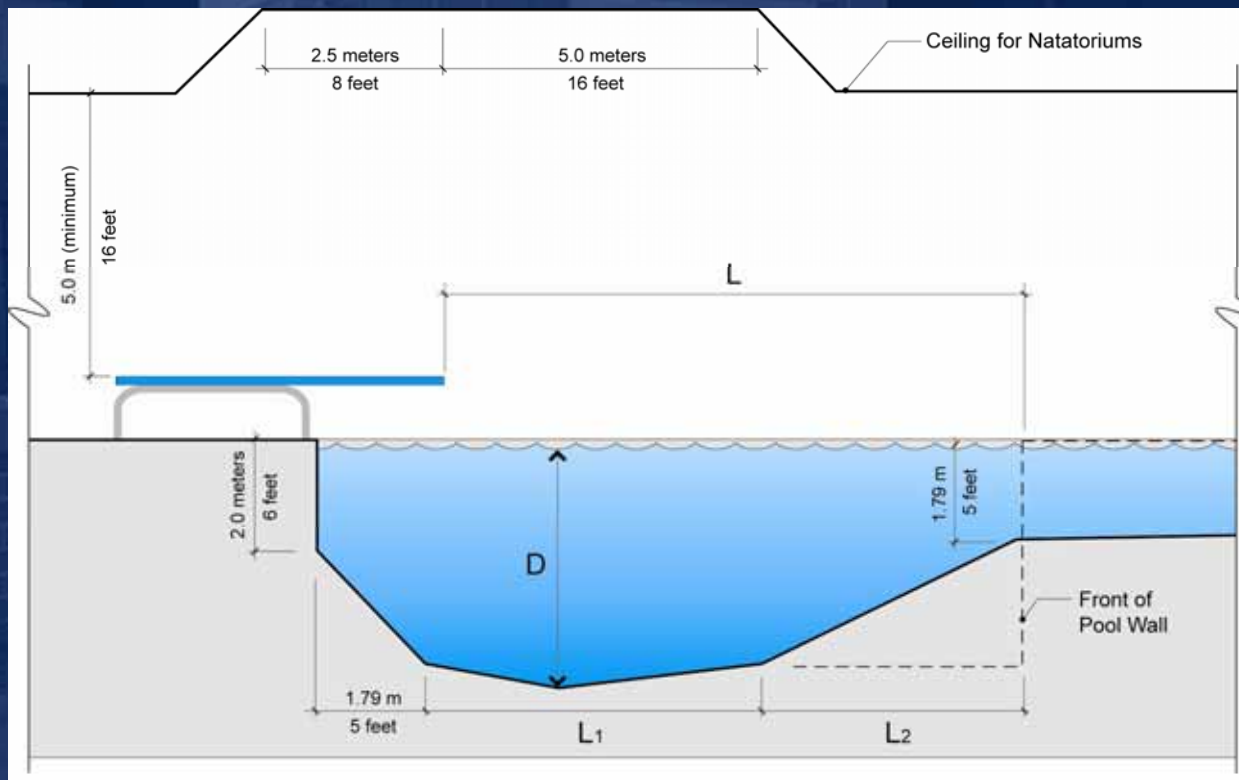


3-METER DIVING BOARD:

The minimum water depth beneath a 3-meter diving board is 3.6 meters (12 feet) for at least 6 meters (20 feet) out from the end of the board.



DIVING BOARD DIMENSIONS:



	L = Distance To Pool Wall	L₁ = Length of Deepest Water	L₂ = Runout to 5'-0" Depth	D = Water Depth
1-Meter Springboard Height	8.8 meters (29 feet)	6.1 meters (20 feet)	2.7 meters (9 feet)	3.0 meters (10 feet)
3-Meter Springboard Height	10.4 meters (34 feet)	6.1 meters (20 feet)	4.3 meters (14 feet)	3.7 meters (12 feet)



POOL CONSTRUCTION:

Of the many types of pools available, the only four recommended for AF use include:

- Poured Concrete
- Guniting (sprayed concrete)
- Guniting with a metal gutter system
- Metal (aluminum or stainless steel)



Guniting Construction



Metal Gutter System

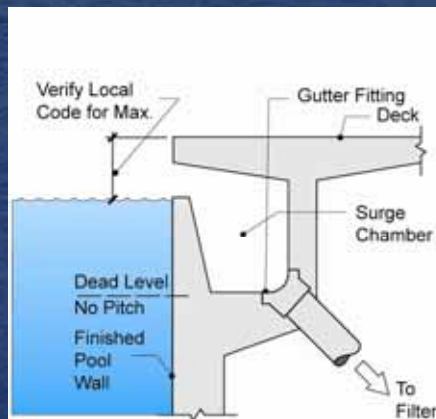
POOL FINISHES:

Gunite construction requires that the pool be lined with either a plaster liner (marble dust plaster or other similar material) or ceramic tile. For visibility and easy maintenance, the pool color should be white or light blue.

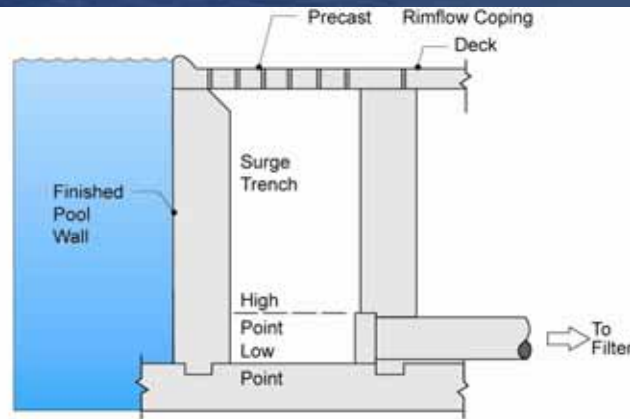


OVERFLOW SYSTEMS:

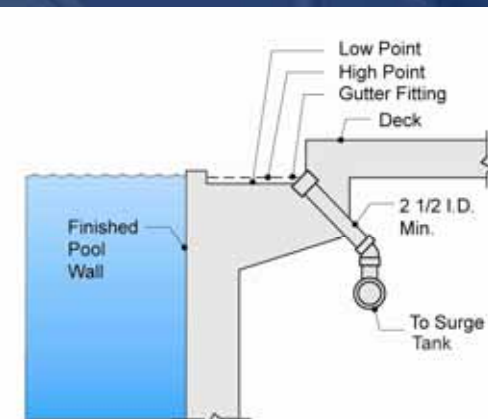
A continuous overflow perimeter system is recommended for main pools to provide constant skimming and surge storage capacity.



Fully Recessed Overflow Gutter System



Rimflow Gutter System



Roll-Out Overflow Gutter System

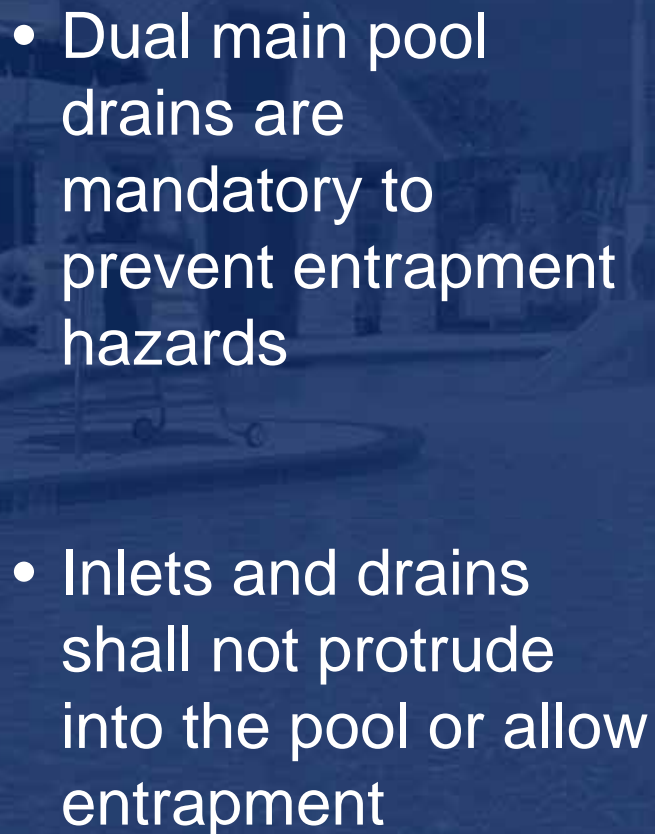
CIRCULATION SYSTEMS:

All portions of the water distribution system serving the swimming pool and auxiliary facilities shall be protected against backflow. Minimum turnover rates shall be as follows:

- Main Pools – Six turnover in 24 hours
- Wading Pools – Twelve turnovers in 24 hours



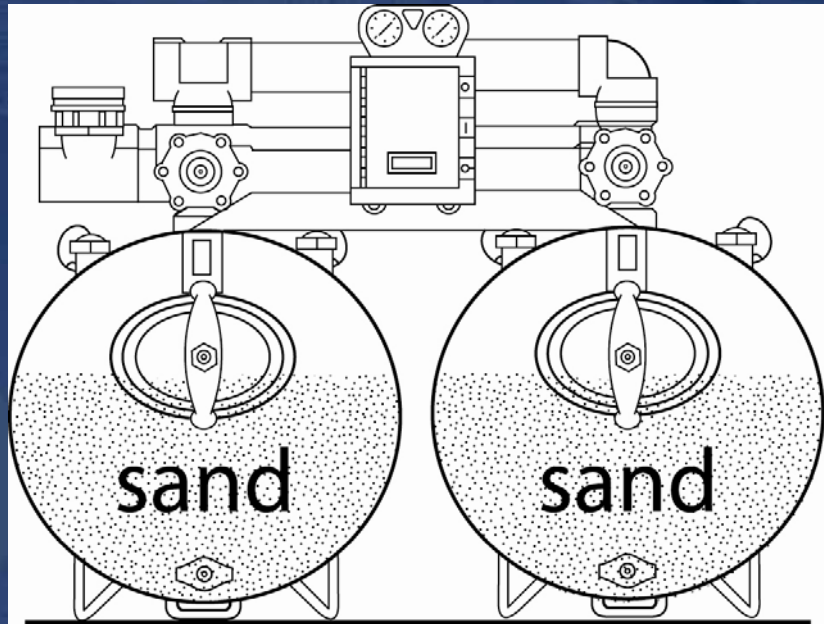
CIRCULATION SYSTEM SCHEMATIC:

- 
- A background image of a swimming pool with a blue overlay. The pool has a circular feature in the foreground and a building in the background. The text is overlaid on the right side of the image.
- Dual main pool drains are mandatory to prevent entrapment hazards
 - Inlets and drains shall not protrude into the pool or allow entrapment

FILTRATION SYSTEMS:

Filtration is the physical process of removing soils which would interfere or impede the disinfection process if not removed. Filters only remove solids and any dissolved elements must be removed as part of the disinfection process.

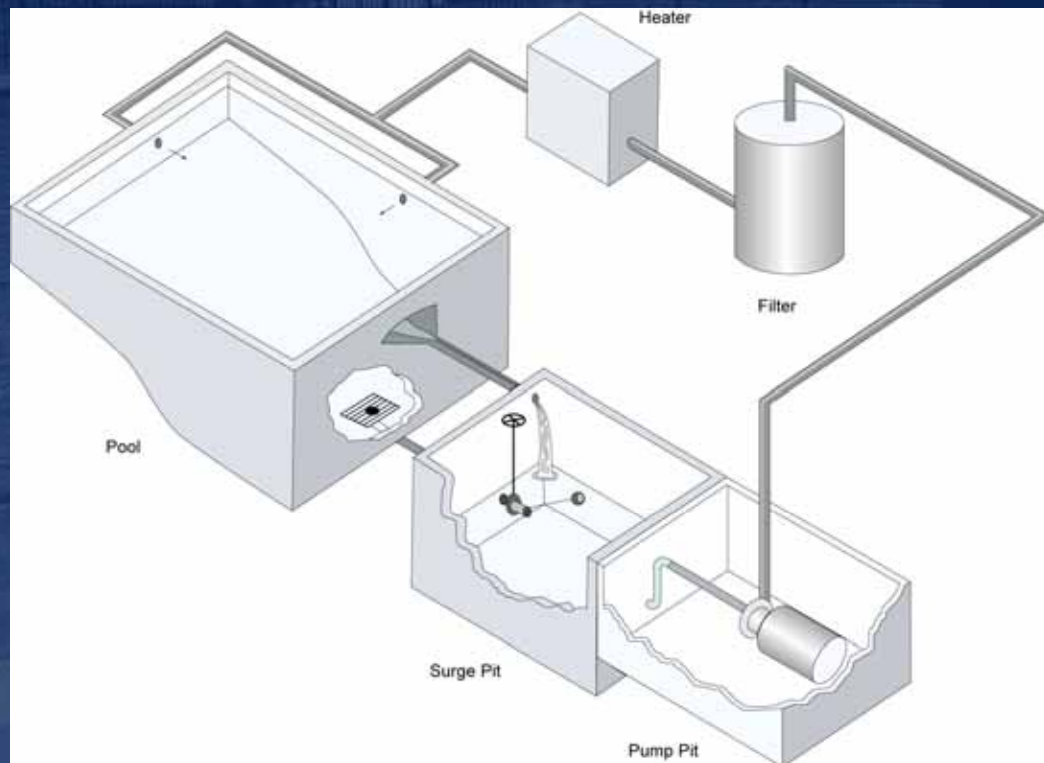
Utilize high rate sand pressure type filtration banks that are National Swimming Pool Foundation (NSPF) approved because their effectiveness actually improves over time due to the buildup of trapped soil that becomes increasingly dense and resistant to water flow.



SURGE TANKS AND PUMP PITS:

Circulation systems shall be equipped with concrete, cast-in-place surge tanks, unless the maximum surge requirements of a pool can be handled by a surge gutter system.

The purpose of a surge tank is to allow water displaced by pool occupants to be collected in the surge tank and later returned to the pool as occupancy decreases.



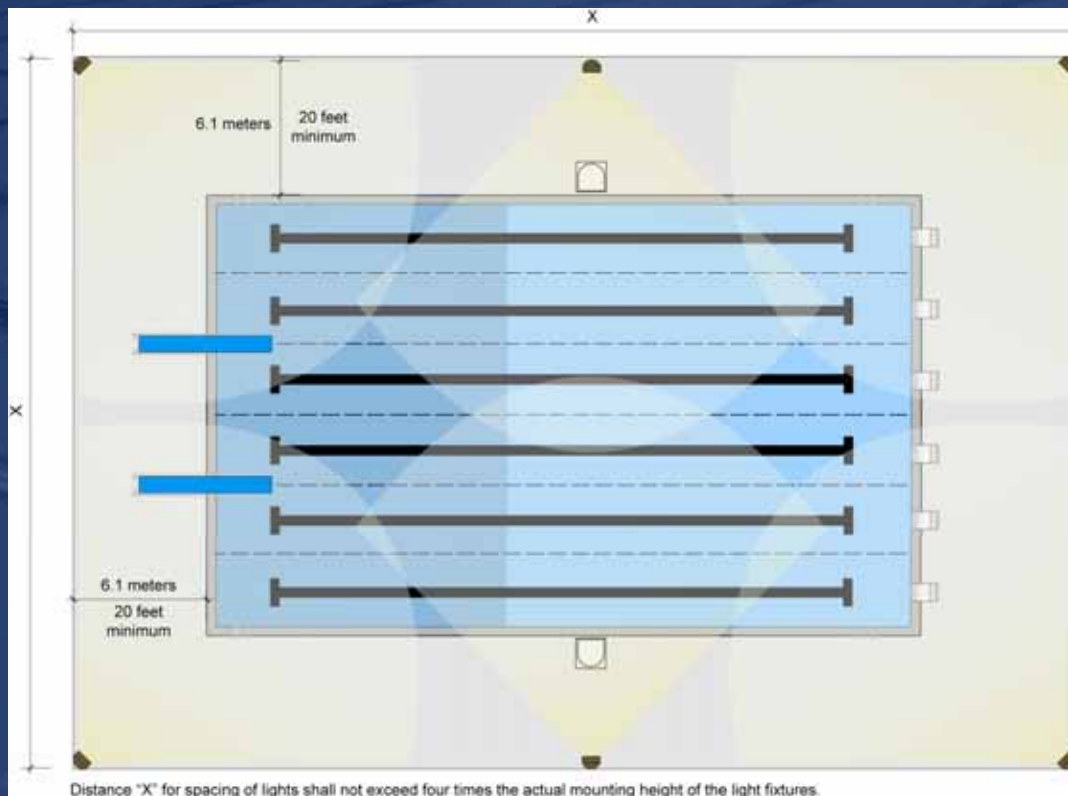
CHEMICAL STORAGE:

Provide a separate chemical storage room or structure for chlorine and other chemicals. Locate this storage area within the mechanical equipment compound or in a room adjacent to the pool equipment that is not accessible to the public.



POOL LIGHTING:

Both area and underwater lighting are required for all pools. Overhead lighting should provide at least 30-foot candles of illumination on the deck and pool area. Underwater lights require 0.5 to 2.0 watts per square foot of water.



POOL DECK DESIGN:

The hard surfaced areas around pools serve as a circulation system and lounging area for pool users. The deck area normally required for outdoor pools is two to three times the pool water area. Pool decks shall be constructed of an impervious material, such as concrete, bluestone, glazing tile, or other hard, non-slip surface.



LIFEGUARD STATIONS:

Provide movable lifeguard stations that can be repositioned, as required, for different activities and conditions. At least one elevated lifeguard stand is required for pools with a surface area of over 186 sq. meters (2,000 sq. feet).



LIFESAFTY EQUIPMENT:

All pools shall be supplied with at least one rescue pole, two rescue tubes or ring buoys attached to 18.3 meters (60 feet) of rope, and two pineapples (wound ropes) of length equal to one and half times the pool width.



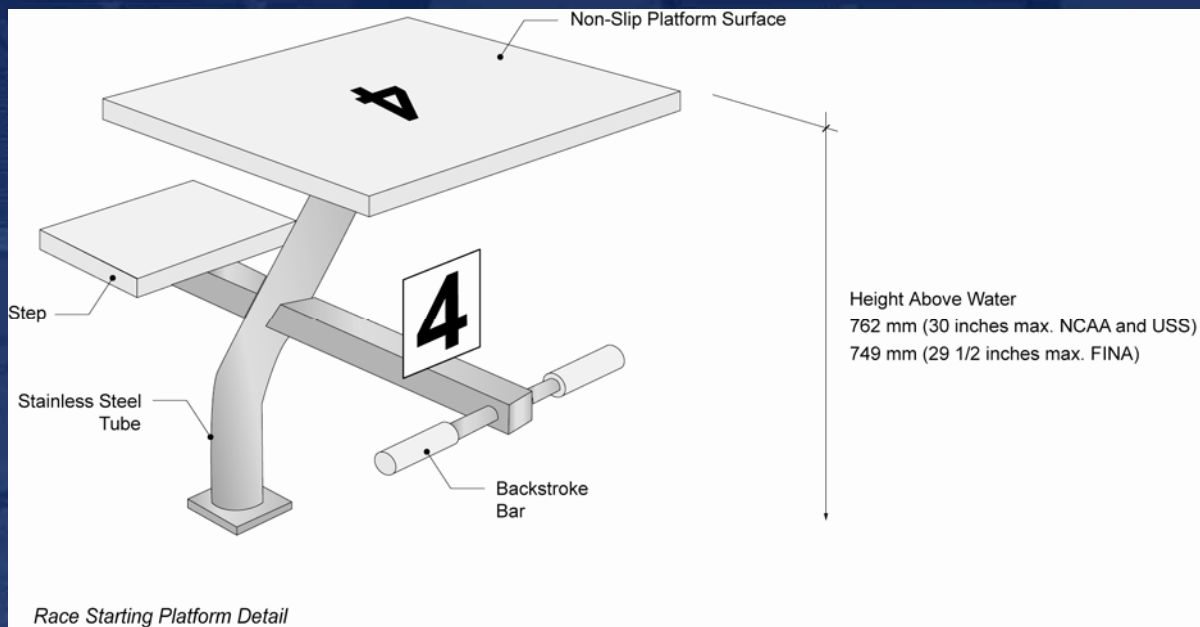
DEPTH MARKINGS:

Depth markers shall be located on the pool deck beside the pool edge and on the vertical side of the pool wall or gutter system above the water line so they are visible from inside the pool.



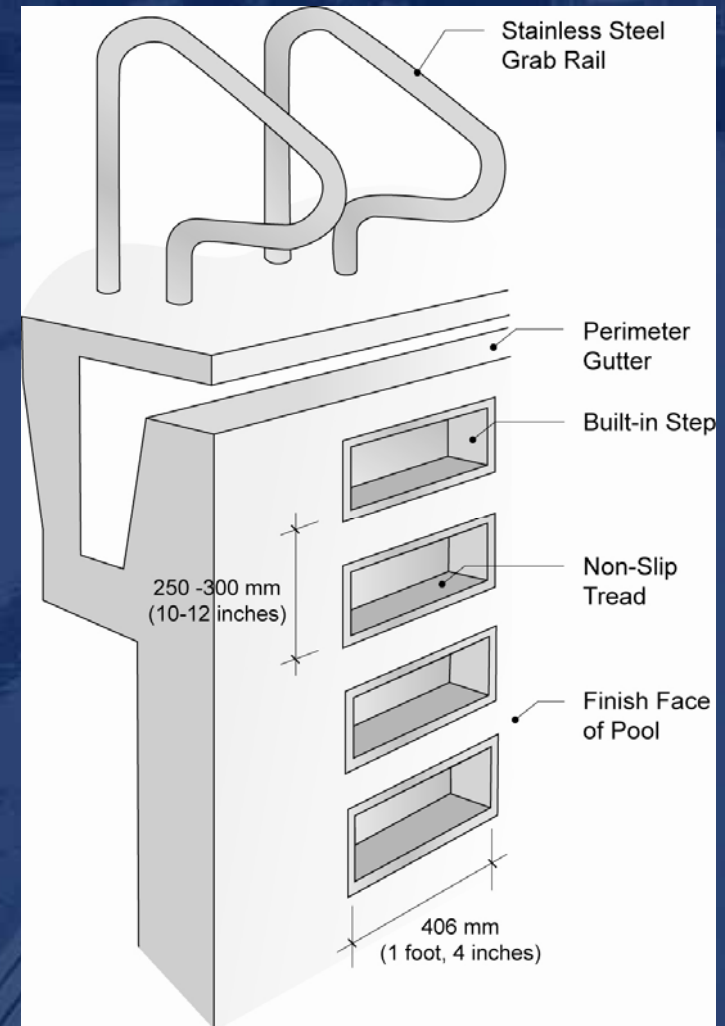
STARTING PLATFORMS:

When competitive swimming is a program requirement, starting platforms shall be supplied for each course lane in the pool area. Starting platforms shall be 760 mm (2 feet, 6 inches) above the water level. The front edge shall be flush with the vertical end wall of the course.



LADDERS AND GRAB RAILS:

Grab rails and recessed steps set into the pool wall are recommended over projecting ladders. No ledges or projections are permitted under the water surface.



POOL STEPS:

One set of shallow water steps or a ramp with a slope of 1:20 is recommended for access into the shallow end of the pool enabling the elderly and handicapped to enter the pool.



POOL DECK FURNISHINGS:

Provide a variety of chairs, tables, and umbrellas designed for outdoor use around the pool deck. Utilize reclining lounge-style chairs for sunbathing and general pool side use. Provide some chairs and tables grouped together with movable umbrellas for shaded, informal seating areas.



SUN SCREENS:

Provide large pool deck areas protected by overhead sun screens, especially around the check-in and bathhouse areas. Provide shade structures that provide shading for a portion of the pool water areas, common grass areas, and at least half of the spray ground or wading pool areas. Provide shade accommodations at each lifeguard station that are adjustable and can be moved according to changing sun conditions.



DECK SIGNAGE:

Appropriate signs shall be provided regarding pool rules at the entrance to the pool deck and within the water areas. “Danger” and “Warning” signs shall be provided, as appropriate, at entrances to the chemical and chlorine storage areas. Include signs that provide emergency numbers near the office telephone, warnings outside the pool area, room names, entry prohibitions, and instructions.



EQUIPMENT STORAGE:

Provide adequate freestanding or built-in storage for instructional and recreational equipment, such as kickboards, floats, buoys, fins, masks, scuba equipment, noodles, pennants, swim trainers, scoreboard, chalkboard, electric clock, water polo goals, water basketball goals, volleyball equipment, pool cleaning equipment, lane markers, pool covering, thermometer, backstroke lines, personal floatation devices and other miscellaneous items.



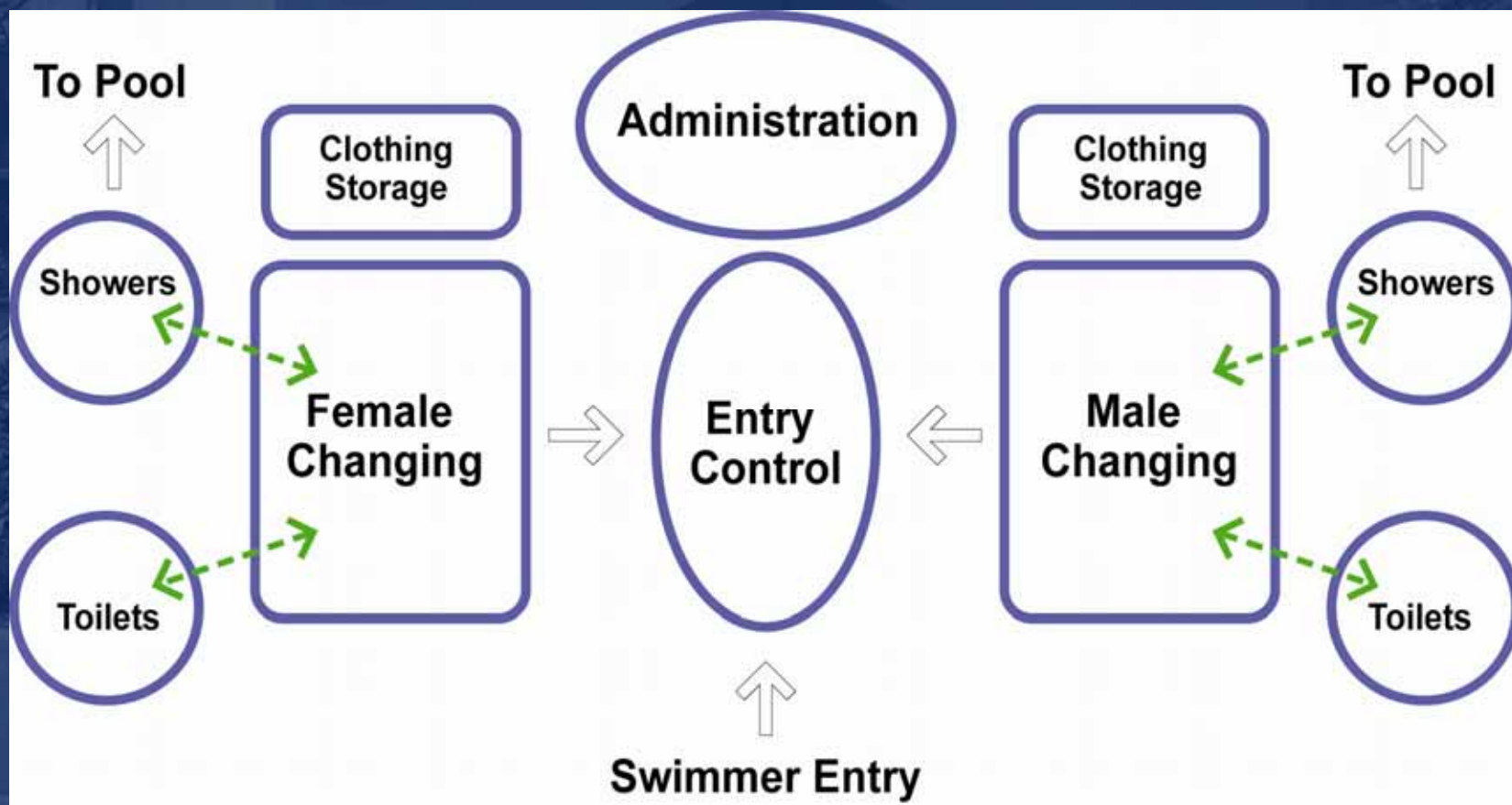
BATHHOUSES:

Bathhouses normally contain the following core spaces:

- Check-in Areas
- Dressing Rooms
- Showers
- Toilets
- Administrative Areas



BATHHOUSE AREA RELATIONSHIPS:



ENTRY CONTROL CHECKPOINTS:

This area serves to monitor the flow of people in and out of the facility. If clothing storage is handled in this area, a basket or locker system is also required and the check-in area shall be immediately adjacent to dressing room exits onto the pool deck area. This space shall also serve as a surveillance station for the pool and deck area.



DRESSING ROOMS:

Dressing areas are used by those participating in swimming programs for changing and dressing. In dressing rooms equipped with lockers or baskets, space is also provided for storage of personal belongings. Separate facilities shall be provided for men and women.



FAMILY DRESSING ROOMS:

Consider the need for separate family dressing rooms with showers, toilets, and sinks to serve the needs of single parent families and/or special needs of the disabled or elderly.

If accessible off the pool deck, these family dressing rooms may also serve as public toilets.



SHOWERS:

Provide showers located inside or adjacent to each dressing room for customer personal hygiene use before and after swimming. Direct access is required from the showers to the dressing area. Separate facilities shall be provided for men and women. At least one private shower cubicle shall be provided for use by the handicapped in accordance with ADA requirements.



LOUNGE AND TRAINING ROOMS:

Room size requirements for the staff lounge will be determined by the number of staff and the needs of those using each space. An optional training room may also be needed to conduct instructional classes and demonstrations in a conference setting. For small facilities, this room may be combined with the staff lounge.



FIRST AID EQUIPMENT:

Provide at least one backboard with arm, torso, and leg immobilization straps, a separate head and neck immobilization system, and a stretcher. Maintain a fully stocked first aid kit with mouth-to-mouth resuscitation masks or guards to prevent disease transmission and other general first aid medical supplies.



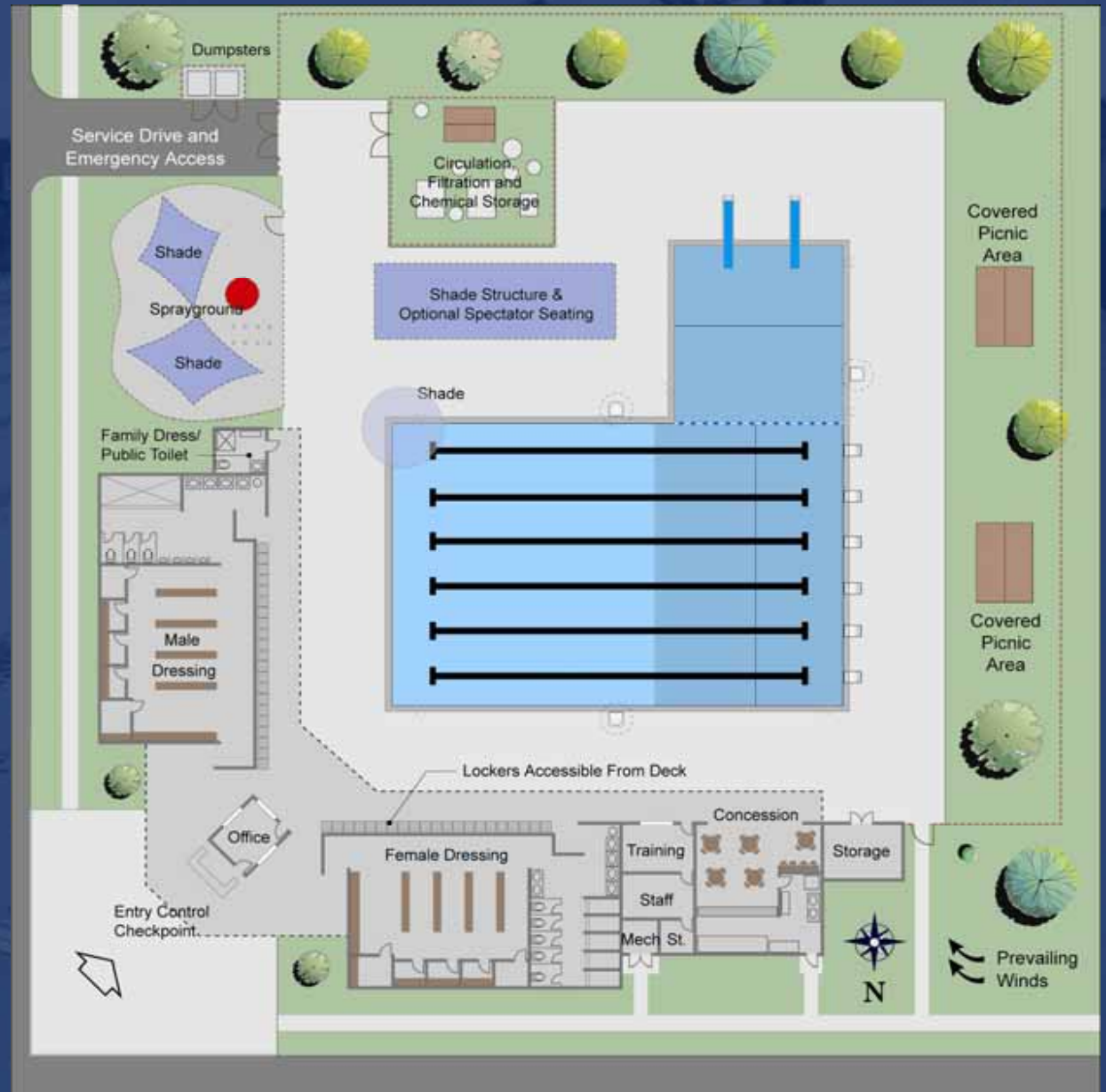
CONCESSION AND VENDING:

Consider the need for food and beverage service within the aquatic facility compound. At a minimum, provide water fountains and vending machines for light snacks, candy, and cold drinks located near the administrative areas of the bathhouse or in a covered area of the pool deck.



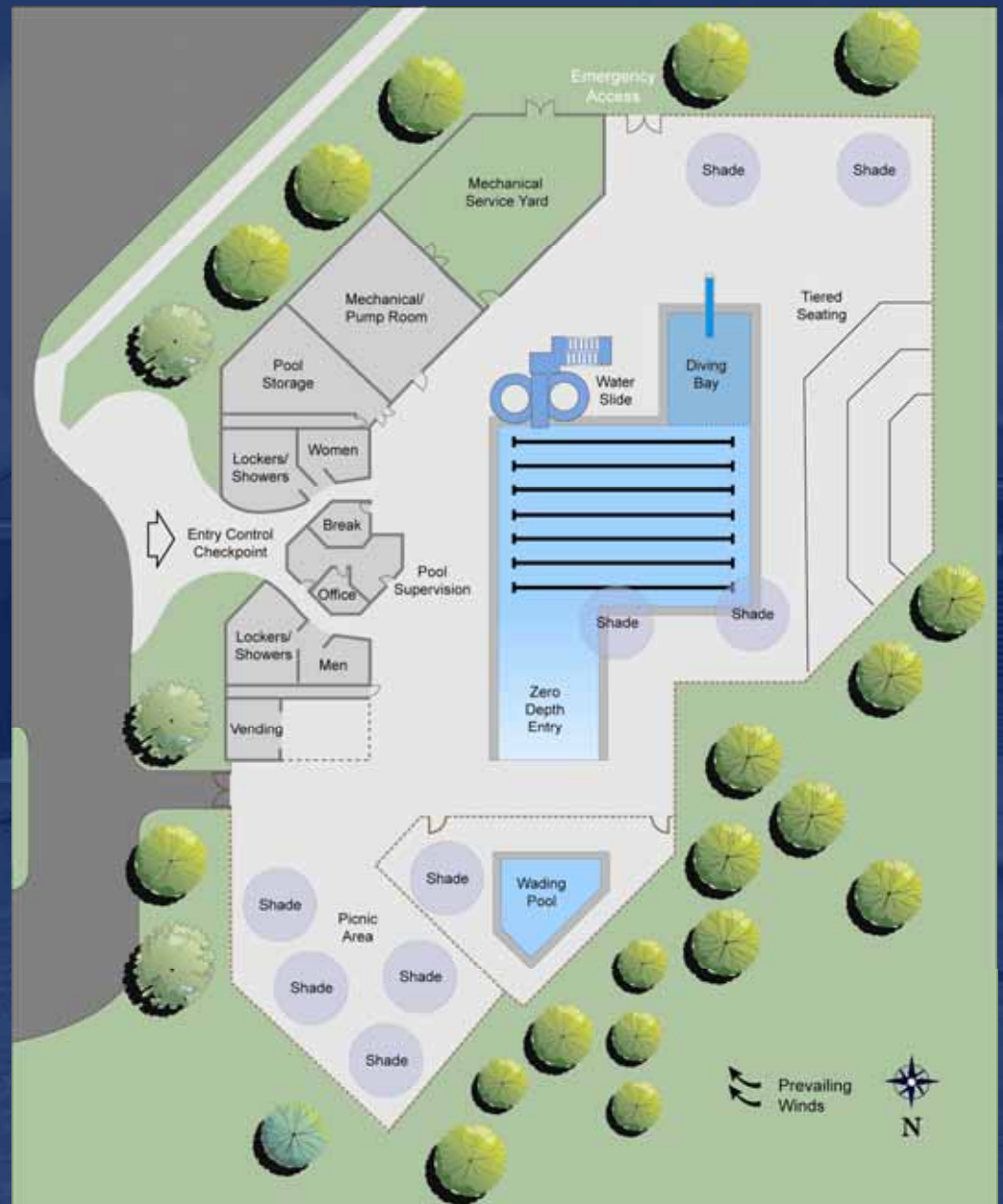
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Prototypical 25-Meter Competitive Aquatic Facility



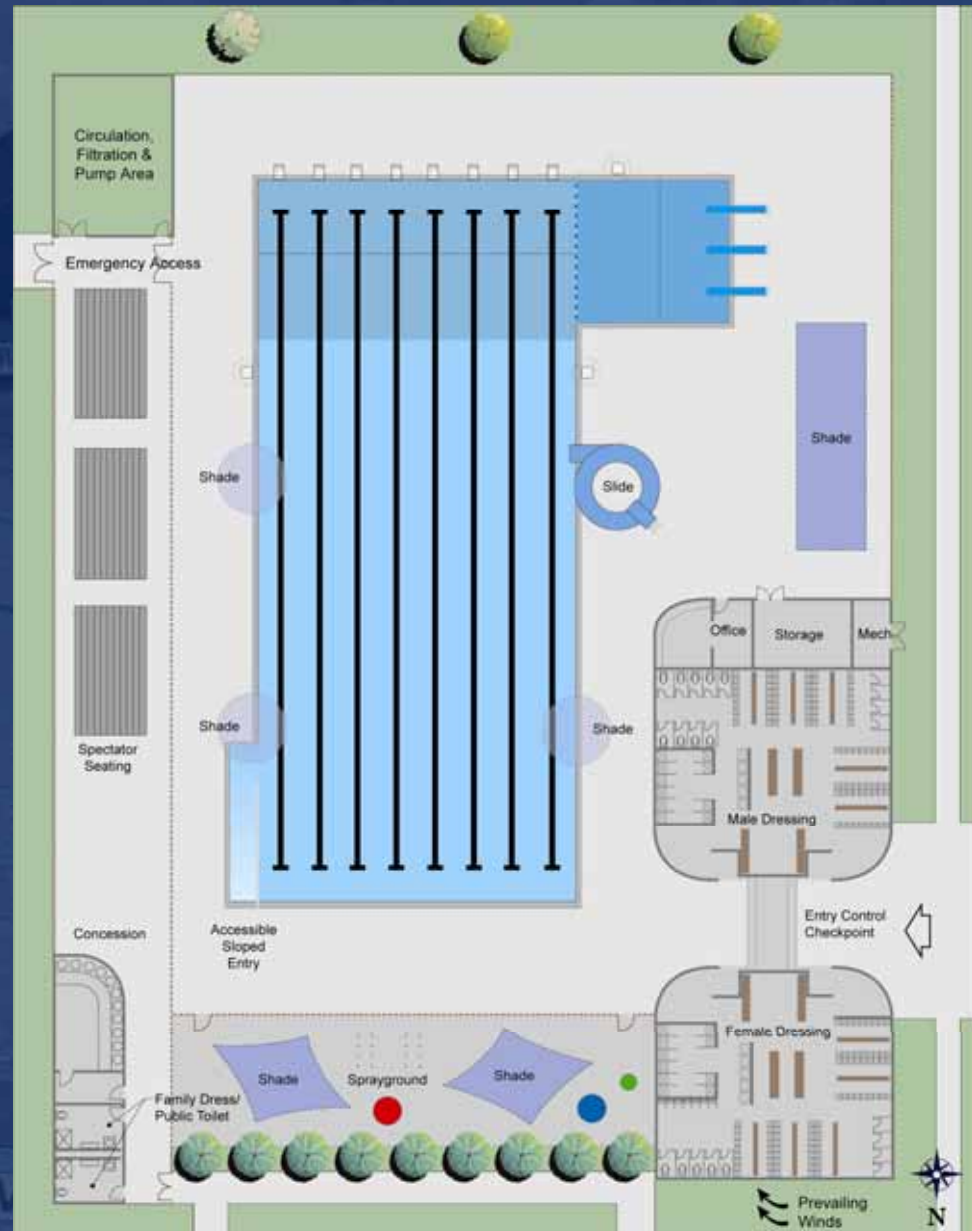
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Prototypical 25-Meter Recreational Aquatic Facility



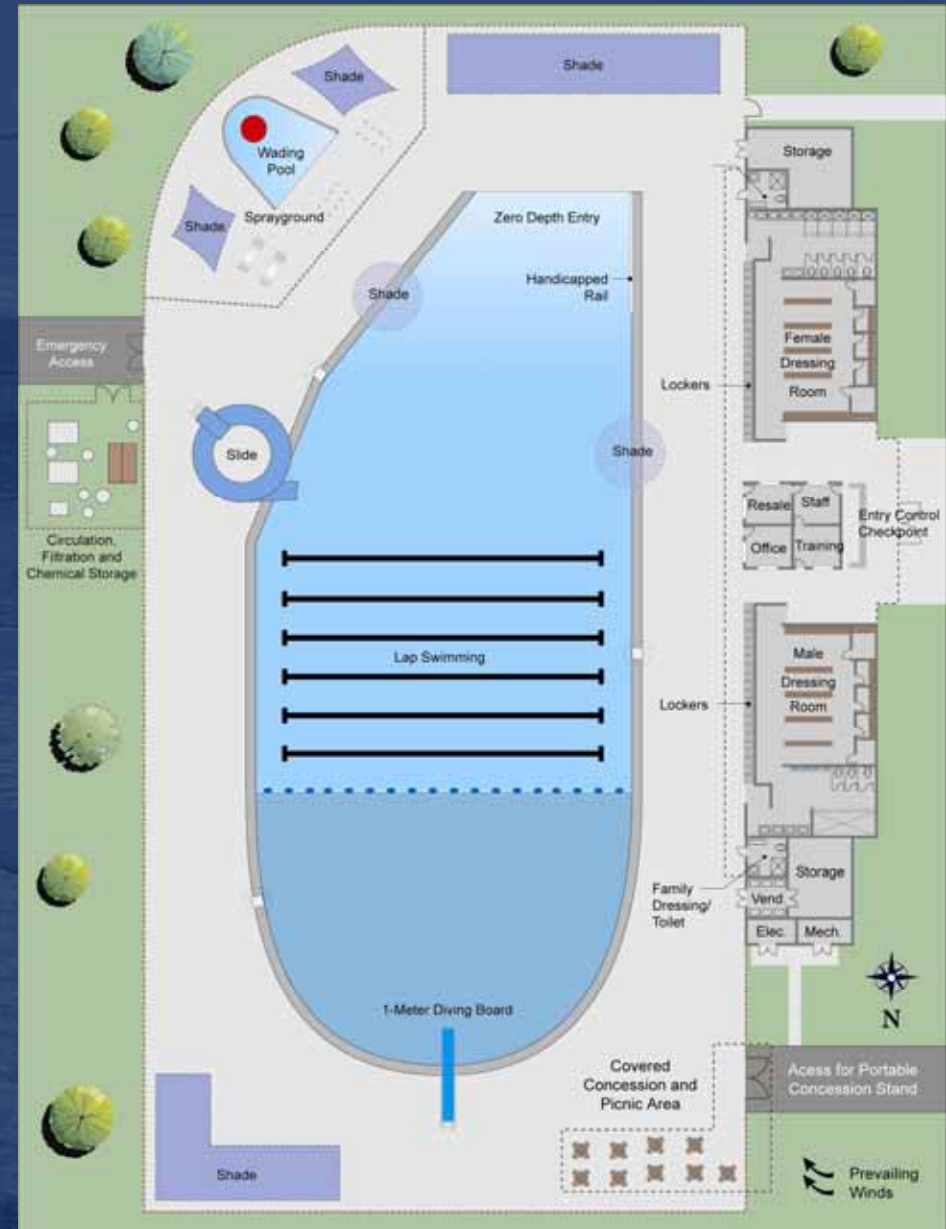
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Prototypical 50-Meter Competitive Aquatic Facility



DESIGN: AQUATIC FACILITIES

Prototypical Recreational Outdoor Aquatic Facility



DESIGN: AQUATIC FACILITIES

Prototypical 25-Meter Natatorium

